Scientific Drilling

OXY USA RMAT

Garfield County, CO NAD27
Shell 797-03B Pad
Shell 697-34-16B

OH

Design: OH

Standard Survey Report

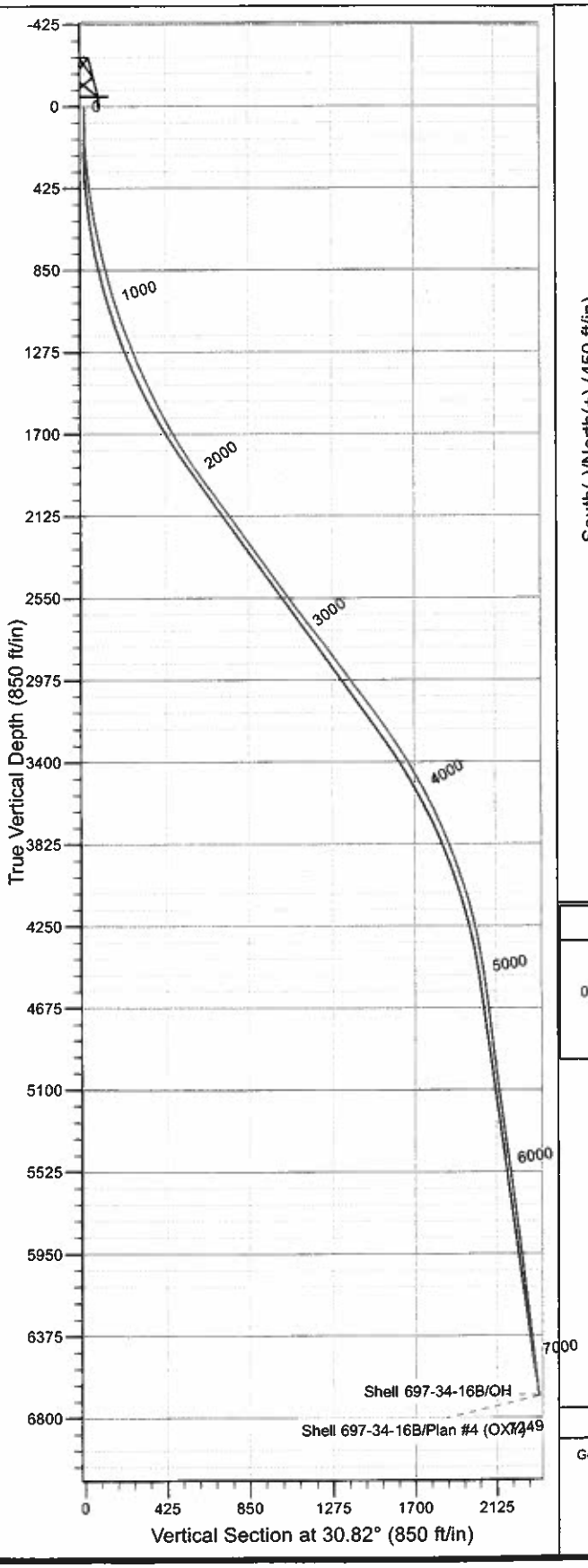
26 October, 2010

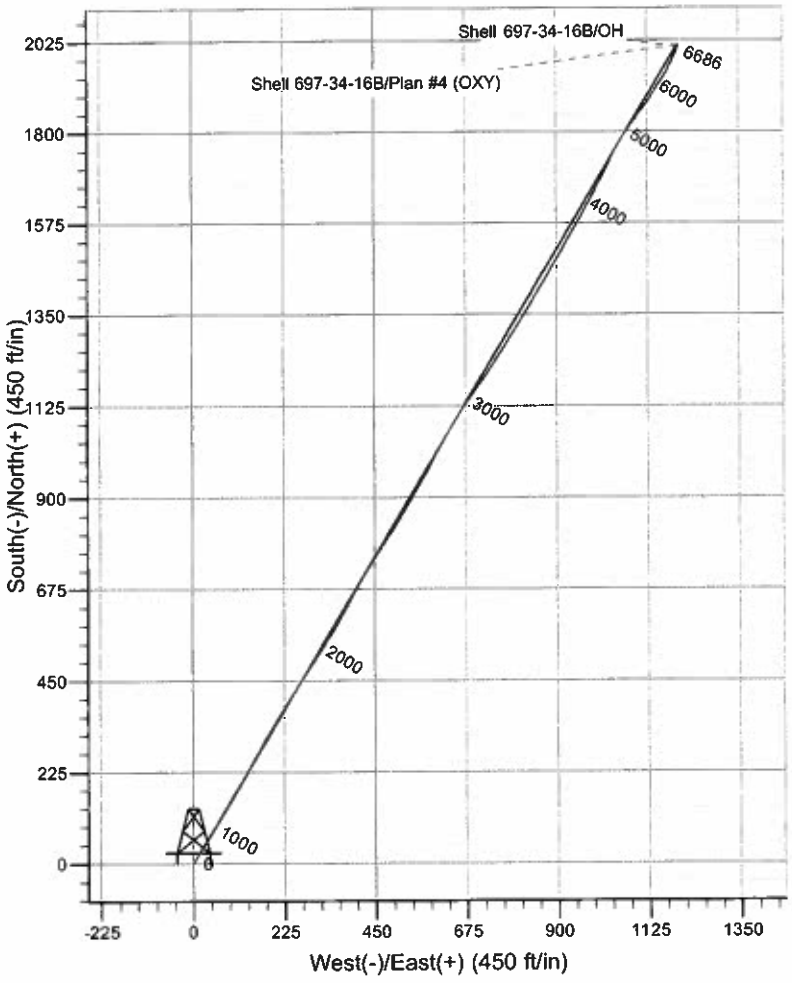
OXY

Scientific Drilling

Project: Garfield County, CO NAD27
Site: Shell 797-03B Pad
Well: Shell 697-34-16B
Wellbore: OH
Design: OH

OXY





WELL DETAILS. Shell 697-34-16B					
Ground Level: GL 6325' & RKB 22' @ 6347.00ft (M37)					
		Northing	Easting	Latitude	Longitude
0.00	0.00	610473.23	1237615.17	39° 28' 42.378 N	108° 12' 4.413 W

REFERENCE INFORMATION	
Co-ordinate (N/E) Reference:	Well Shell 697-34-16B, True North
Vertical (TVD) Reference:	GL 6325' & RKB 22' @ 6347.00ft (M37)
Section (VS) Reference:	Slot - (0.00N, 0.00E)
Measured Depth Reference:	GL 6325' & RKB 22' @ 6347.00ft (M37)
Calculation Method:	Minimum Curvature
Local North:	True
Location:	Sec 3 T7S R97W

PROJECT DETAILS: Garfield County, CO NAD27	Design: OH (Shell 697-34-16B/OH)
Geodetic System: US State Plane 1927 (Exact solution) Datum: NAD 1927 (NADCON CONUS) Ellipsoid: Clarke 1866 Zone: Colorado Central 502	Created By: Julie Cruse Date: 2010-10-26

Company:	OXY USA RMAT	**Local Co-ordinate Reference:**	Well Shell 697-34-16B
Project:	Garfield County, CO NAD27	**TVD Reference:**	GL 6325' & RKB 22' @ 6347.00ft (M37)
Site:	Shell 797-03B Pad	**MD Reference:**	GL 6325' & RKB 22' @ 6347.00ft (M37)
Well:	Shell 697-34-16B	**North Reference:**	True
Wellbore:	OH	**Survey Calculation Method:**	Minimum Curvature
Design:	OH	**Database:**	Rockies-R5000.1

Project	Garfield County, CO NAD27		
Map System:	US State Plane 1927 (Exact solution)	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	Colorado Central 502		

Site	Shell 797-03B Pad, Sec 3 T7S R97W				
Site Position:		**Northing:**	610,470.20 usft	**Latitude:**	39° 28' 42.340 N
From:	Lat/Long	**Easting:**	1,237,588.64 usft	**Longitude:**	108° 12' 4.750 W
Position Uncertainty:	0.00 ft	**Slot Radius:**	13.200 in	**Grid Convergence:**	-1.70 °

Well	Shell 697-34-16B,						
Well Position	**+N/-S**	0.00 ft	**Northing:**	610,473.24 usft	**Latitude:**	39° 28' 42.378 N
	+E/-W	0.00 ft	**Easting:**	1,237,615.17 usft	**Longitude:**	108° 12' 4.413 W
Position Uncertainty		0.00 ft	**Wellhead Elevation:**	ft	**Ground Level:**	6,325.00 ft

Wellbore	OH			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2005-10	2010-10-14	10.50	65.72	52,309

Design	OH				
Audit Notes:					
Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0.00

Vertical Section:	**Depth From (TVD) (ft)**	**+N/-S (ft)**	**+E/-W (ft)**	**Direction (°)**
	0.00	0.00	0.00	30.82

Survey Program **Date** 2010-10-26

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
78.00	824.00	Survey #1- Surface Gyro (OH)	Standard Keeper 103	Standard Wireline Keeper ver 1.0.3
910.00	1,276.00	Survey #2 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA
1,380.00	7,249.00	Survey #3 - Production (OH)	MWD-SDI	MWD - Standard ISCWSA

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
78.00	0.35	342.60	78.00	0.23	-0.07	0.16	0.45	0.45	0.00
107.00	0.97	33.93	107.00	0.52	0.04	0.46	2.76	2.14	177.00
138.00	1.32	26.02	137.99	1.05	0.34	1.08	1.24	1.13	-25.52
169.00	1.94	29.71	168.98	1.83	0.76	1.96	2.03	2.00	11.90
200.00	2.55	34.19	199.95	2.86	1.41	3.17	2.05	1.97	14.45
232.00	3.78	32.26	231.91	4.34	2.37	4.94	3.86	3.84	-6.03
263.00	4.40	39.29	262.83	6.12	3.67	7.14	2.57	2.00	22.68
294.00	5.19	32.34	293.72	8.23	5.17	9.71	3.16	2.55	-22.42

Company:	OXY USA RMAT	**Local Co-ordinate Reference:**	Well Shell 697-34-16B
Project:	Garfield County, CO NAD27	**TVD Reference:**	GL 6325' & RKB 22' @ 6347.00ft (M37)
Site:	Shell 797-03B Pad	**MD Reference:**	GL 6325' & RKB 22' @ 6347.00ft (M37)
Well:	Shell 697-34-16B	**North Reference:**	True
Wellbore:	OH	**Survey Calculation Method:**	Minimum Curvature
Design:	OH	**Database:**	Rockies-R5000.1

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
325.00	5.89	30.85	324.57	10.78	6.74	12.71	2.31	2.26	-4.81
356.00	5.98	32.08	355.41	13.51	8.41	15.91	0.50	0.29	3.97
388.00	6.95	33.22	387.20	16.54	10.36	19.51	3.06	3.03	3.56
419.00	7.21	31.99	417.97	19.76	12.41	23.33	0.97	0.84	-3.97
450.00	7.57	32.08	448.71	23.14	14.53	27.32	1.16	1.16	0.29
481.00	8.36	31.99	479.41	26.78	16.81	31.61	2.55	2.55	-0.29
513.00	8.71	33.31	511.06	30.78	19.37	36.36	1.25	1.09	4.13
544.00	9.50	31.73	541.66	34.92	22.01	41.26	2.67	2.55	-5.10
575.00	10.21	32.17	572.21	39.42	24.81	46.57	2.30	2.29	1.42
637.00	10.73	30.85	633.17	49.03	30.70	57.83	0.92	0.84	-2.13
730.00	13.11	31.38	724.16	65.47	40.63	77.04	2.56	2.56	0.57
824.00	13.90	28.83	815.56	84.46	51.63	98.98	1.05	0.84	-2.71
Last Gyro Survey									
910.00	14.51	32.83	898.94	102.56	62.45	120.07	1.34	0.71	4.65
First SDI MWD Survey									
1,005.00	16.71	32.39	990.43	124.10	76.22	145.62	2.32	2.32	-0.46
1,098.00	18.73	30.72	1,079.01	148.23	91.01	173.92	2.24	2.17	-1.80
1,193.00	21.46	29.66	1,168.22	176.45	107.41	206.56	2.90	2.87	-1.12
1,276.00	22.25	28.79	1,245.25	203.41	122.49	237.44	1.03	0.95	-1.05
Last Survey in 12 1/4" Hole									
1,380.00	23.39	28.08	1,341.11	238.88	141.69	277.74	1.13	1.10	-0.68
First Survey in 7 7/8" Hole									
1,475.00	25.59	29.75	1,427.56	273.34	160.75	317.09	2.43	2.32	1.76
1,570.00	26.47	29.58	1,512.92	309.56	181.38	358.78	0.93	0.93	-0.18
1,666.00	28.05	31.86	1,598.26	347.34	203.86	402.74	1.97	1.65	2.38
1,760.00	29.55	32.39	1,680.63	385.69	227.94	448.01	1.62	1.60	0.56
1,856.00	31.57	32.56	1,763.29	426.87	254.15	496.80	2.11	2.10	0.18
1,951.00	33.68	33.27	1,843.30	469.85	281.99	547.98	2.26	2.22	0.75
2,047.00	36.05	33.36	1,922.06	515.71	312.13	602.80	2.47	2.47	0.09
2,142.00	36.84	31.77	1,998.48	563.27	342.49	659.20	1.30	0.83	-1.67
2,237.00	35.88	28.35	2,074.99	611.99	370.71	715.50	2.36	-1.01	-3.60
2,332.00	35.00	28.08	2,152.39	660.53	396.76	770.53	0.94	-0.93	-0.28
2,428.00	35.09	31.07	2,230.99	708.46	423.96	825.62	1.79	0.09	3.11
2,523.00	35.96	32.83	2,308.31	755.29	453.18	880.81	1.41	0.92	1.85
2,618.00	34.47	33.18	2,385.92	801.23	483.01	935.55	1.58	-1.57	0.37
2,713.00	35.44	31.25	2,463.79	847.28	512.01	989.95	1.55	1.02	-2.03
2,809.00	36.05	30.28	2,541.70	895.47	540.70	1,046.03	0.87	0.64	-1.01
2,905.00	36.32	29.66	2,619.19	944.57	569.01	1,102.70	0.47	0.28	-0.65
3,000.00	37.28	27.47	2,695.26	994.55	596.20	1,159.56	1.71	1.01	-2.31
3,097.00	36.49	29.66	2,772.85	1,045.68	624.03	1,217.72	1.58	-0.81	2.26
3,191.00	35.61	30.98	2,848.85	1,093.43	651.95	1,273.04	1.25	-0.94	1.40
3,287.00	37.11	35.38	2,926.17	1,141.01	683.11	1,329.87	3.13	1.56	4.58
3,383.00	36.58	35.03	3,002.99	1,188.05	716.30	1,387.27	0.59	-0.55	-0.36
3,479.00	37.02	33.27	3,079.86	1,235.64	748.57	1,444.67	1.19	0.46	-1.83

Company:	OXY USA RMAT	**Local Co-ordinate Reference:**	Well Shell 697-34-16B
Project:	Garfield County, CO NAD27	**TVD Reference:**	GL 6325' & RKB 22' @ 6347.00ft (M37)
Site:	Shell 797-03B Pad	**MD Reference:**	GL 6325' & RKB 22' @ 6347.00ft (M37)
Well:	Shell 697-34-16B	**North Reference:**	True
Wellbore:	OH	**Survey Calculation Method:**	Minimum Curvature
Design:	OH	**Database:**	Rockies-R5000.1

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
3,575.00	35.26	32.39	3,157.39	1,283.21	779.27	1,501.25	1.91	-1.83	-0.92
3,671.00	34.47	30.63	3,236.16	1,329.98	807.96	1,556.12	1.33	-0.82	-1.83
3,766.00	33.59	30.98	3,314.89	1,375.65	835.18	1,609.28	0.95	-0.93	0.37
3,862.00	31.92	31.25	3,395.62	1,420.11	862.02	1,661.22	1.75	-1.74	0.28
3,957.00	29.02	29.93	3,477.49	1,461.56	886.55	1,709.38	3.13	-3.05	-1.39
4,051.00	28.05	29.75	3,560.07	1,500.51	908.90	1,754.28	1.04	-1.03	-0.19
4,146.00	25.85	29.84	3,644.75	1,537.88	930.29	1,797.32	2.32	-2.32	0.09
4,242.00	23.74	30.19	3,731.90	1,572.74	950.42	1,837.58	2.20	-2.20	0.36
4,337.00	21.54	28.87	3,819.57	1,604.54	968.46	1,874.13	2.38	-2.32	-1.39
4,431.00	21.10	29.05	3,907.14	1,634.45	985.01	1,908.29	0.47	-0.47	0.19
4,526.00	19.87	27.38	3,996.13	1,663.73	1,000.74	1,941.50	1.43	-1.29	-1.76
4,627.00	16.80	27.29	4,091.99	1,691.95	1,015.33	1,973.21	3.04	-3.04	-0.09
4,717.00	13.81	27.38	4,178.79	1,713.05	1,026.23	1,996.92	3.32	-3.32	0.10
4,813.00	12.40	25.97	4,272.29	1,732.49	1,036.02	2,018.63	1.51	-1.47	-1.47
4,908.00	10.82	27.91	4,365.34	1,749.55	1,044.66	2,037.70	1.71	-1.66	2.04
5,003.00	9.23	26.76	4,458.89	1,764.23	1,052.26	2,054.21	1.69	-1.67	-1.21
5,098.00	7.91	33.62	4,552.83	1,776.48	1,059.31	2,068.34	1.76	-1.39	7.22
5,193.00	7.47	33.00	4,646.97	1,787.10	1,066.30	2,081.04	0.47	-0.46	-0.65
5,289.00	6.86	32.56	4,742.22	1,797.16	1,072.78	2,093.00	0.64	-0.64	-0.46
5,383.00	6.68	30.54	4,835.57	1,806.61	1,078.58	2,104.08	0.32	-0.19	-2.15
5,479.00	7.47	35.99	4,930.84	1,816.46	1,085.08	2,115.88	1.08	0.82	5.68
5,575.00	7.91	36.34	5,025.97	1,826.83	1,092.66	2,128.67	0.46	0.46	0.36
5,670.00	7.39	33.44	5,120.13	1,837.20	1,099.91	2,141.28	0.68	-0.55	-3.05
5,765.00	7.39	37.22	5,214.34	1,847.16	1,106.97	2,153.45	0.51	0.00	3.98
5,860.00	8.71	36.61	5,308.40	1,857.80	1,114.95	2,166.68	1.39	1.39	-0.64
5,956.00	7.83	36.08	5,403.40	1,868.92	1,123.14	2,180.43	0.92	-0.92	-0.55
6,051.00	8.53	32.39	5,497.43	1,880.10	1,130.72	2,193.91	0.92	0.74	-3.88
6,146.00	7.65	32.04	5,591.49	1,891.41	1,137.85	2,207.28	0.93	-0.93	-0.37
6,241.00	7.56	30.72	5,685.65	1,902.14	1,144.40	2,219.85	0.21	-0.09	-1.39
6,336.00	7.65	32.92	5,779.82	1,912.82	1,151.03	2,232.42	0.32	0.09	2.32
6,431.00	7.91	37.05	5,873.94	1,923.35	1,158.40	2,245.23	0.65	0.27	4.35
6,526.00	6.51	33.71	5,968.19	1,933.05	1,165.33	2,257.11	1.54	-1.47	-3.52
6,621.00	6.42	28.79	6,062.59	1,942.18	1,170.88	2,267.80	0.59	-0.09	-5.18
6,717.00	7.30	26.06	6,157.90	1,952.36	1,176.14	2,279.24	0.98	0.92	-2.84
6,810.00	7.74	25.62	6,250.10	1,963.32	1,181.45	2,291.37	0.48	0.47	-0.47
6,905.00	7.03	24.65	6,344.31	1,974.37	1,186.64	2,303.52	0.76	-0.75	-1.02
7,001.00	6.60	23.95	6,439.63	1,984.75	1,191.33	2,314.83	0.46	-0.45	-0.73
7,096.00	6.16	23.60	6,534.04	1,994.41	1,195.58	2,325.31	0.46	-0.46	-0.37
7,191.00	5.72	20.17	6,628.53	2,003.53	1,199.26	2,335.02	0.59	-0.46	-3.61
Last SDI MWD Survey									
7,249.00	5.72	20.17	6,686.24	2,008.95	1,201.25	2,340.70	0.00	0.00	0.00

Projection to TD - BHL = 612445.58 ft N, 1238875.62 ft E

Company:	OXY USA RMAT	**Local Co-ordinate Reference:**	Well Shell 697-34-16B
Project:	Garfield County, CO NAD27	**TVD Reference:**	GL 6325' & RKB 22' @ 6347.00ft (M37)
Site:	Shell 797-03B Pad	**MD Reference:**	GL 6325' & RKB 22' @ 6347.00ft (M37)
Well:	Shell 697-34-16B	**North Reference:**	True
Wellbore:	OH	**Survey Calculation Method:**	Minimum Curvature
Design:	OH	**Database:**	Rockies-R5000.1

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
824.00	815.56	84.46	51.63	Last Gyro Survey
910.00	898.94	102.56	62.45	First SDI MWD Survey
1,276.00	1,245.25	203.41	122.49	Last Survey in 12 1/4" Hole
1,380.00	1,341.11	238.88	141.69	First Survey in 7 7/8" Hole
7,191.00	6,628.53	2,003.53	1,199.26	Last SDI MWD Survey
7,249.00	6,686.24	2,008.95	1,201.25	Projection to TD
7,249.00	6,686.24	2,008.95	1,201.25	BHL = 612445.58 ft N, 1238875.62 ft E

Checked By: _____ Approved By: _____ Date: _____